

WHAT IS CLAIMED IS:

1. A projection display apparatus that projects images onto a screen in response to given image data, comprising:

an embellishment effect memory for storing embellishment effect data
5 representing an embellishment effect image that can be used to embellish an arbitrary image;

an image embellishment section that generates embellished image data by overlaying an original image represented by the given image data and the embellishment effect image;

10 a light modulation unit that is driven in response to the embellished image data pixel by pixel; and

an optical system for projecting onto the screen the embellished image obtained by the light modulation unit.

15 ^{The} 2. A projection display apparatus according to claim 1, wherein the image embellishment section comprises an image overlay section that overlays the embellishment effect image at a specified location on the original image.

A 3. ^{The} A projection display apparatus according to claim 2, wherein:
20 the embellishment effect memory stores a plurality of embellishment effect data representing a plurality of embellishment effect images; and

the image overlay section superimposes at least one selected embellishment image at each specified position on the original image.

25 A 4. ^{The} A projection display apparatus according to claim 2 ~~or 3~~, wherein the

image overlay section comprising:

an embellishment effect bitmap memory for storing embellishment effect
bitmap data obtained from the embellishment effect data;

5 a synthesizer section that generates the embellished image data by
synthesizing the given image data and the embellishment effect bitmap data read
from the embellishment effect bitmap memory; and

10 a frame memory for storing the embellished image data, the frame
memory having at least a memory area corresponding to all the pixels of the light
modulation unit, the embellished image data read out from the frame memory
being provided to the light modulation unit.

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5. A projection display apparatus according to claim 2 ~~or 3~~, wherein the
image overlay section comprising:

15 an embellishment effect bitmap memory for storing embellishment effect
bitmap data obtained from the embellishment effect data;

a frame memory for storing the given image data, the frame memory
having at least a memory area corresponding to all the pixels of the light
modulation unit; and

20 a synthesizer section that generates the embellished image data by
synthesizing image data read from the frame memory and the embellishment
effect bitmap data read from the embellishment effect bitmap memory, the
embellished image data synthesized by the synthesizer section being provided to
the light modulation unit.

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6. A projection display apparatus according to claim 4 ~~or 5~~, wherein the

synthesizer section comprises a data selector that selects either one of the image data and the embellishment effect bitmap data, pixel by pixel, to produce the embellished image data.

- 5 A 7. ^{The} A projection display apparatus according to claim 4 ~~or 5~~, wherein the synthesizer section comprising:

a multiplier section that multiplies the image data and the embellishment effect bitmap data by respective coefficients on a pixel by pixel basis; and

10 an adder section that adds the embellishment effect bitmap data and the image data thus multiplied by the multiplier section, on a pixel by pixel basis.

- A 8. ^{The} A projection display apparatus according to claim 7, wherein the synthesizer section comprises a coefficient setting section that controls the coefficients in the multiplier section so as to change a synthesis ratio between the
15 image data and the embellishment effect bitmap data, thereby adjusting a degree of transparency of embellishment effects.

- A 9. ^{The} A projection display apparatus according to claim 8, wherein the coefficient setting section changes the coefficients in the multiplier section with
20 time so as to change the synthesis ratio between the image data and embellishment effect bitmap data, thereby changing the degree of transparency of the embellishment effects with time.

- 25 10. A projection display apparatus that projects images onto a screen, comprising:

a frame memory for storing given original image data;

a first embellishment memory for storing a first embellishment image data representing a first embellishment image having a shape and size that can be set;

a second embellishment memory for storing a second embellishment image data representing a second embellishment image having a size that can be altered while a shape is maintained similar;

an image embellishment section that generates embellished image data representing embellished image by overlaying an original image represented by the original image data with at least one of the first embellishment image and the second embellishment image;

an image display signal generator for generating image display signals based on the embellished image data;

an electro-optical device for emitting light that forms images in response to the image display signals; and

a projection optical system for projecting light emitted by the electro-optical device.

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A. 11. A projection display apparatus according to claim 10, wherein:

the first embellishment memory has a memory space to hold $1/n$ (where n is an integer of at least 1) lines and $1/n$ pixels of the frame memory and stores the first embellishment image data in an area corresponding to the position at which the first embellishment images are to be superimposed;

the second embellishment memory stores the second embellishment image data and stores at least coordinate data indicating the overlay position thereof on the original image.

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A 12. A projection display apparatus according to claim 11, wherein n is an integer of at least 2.

5 13. A projection display apparatus according to one of claims 10 to 12, wherein the image embellishment section comprising:

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10 a multiplier section that multiplies the original image data read from the frame memory and one of the first embellishment image data from the first embellishment memory and the second embellishment image data from the second embellishment memory by respective coefficients on a pixel by pixel basis; and

an adder section that adds one of the first embellishment image data and the second embellishment image data and the original image data multiplied by the respective coefficients, pixel by pixel.

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15 14. *The* A projection display apparatus according to claim 13, wherein the image embellishment section comprises a coefficient setting section that controls the coefficients in the multiplier section so as to change a synthesis ratio between the original image data and one of the first embellishment image data and the
20 second embellishment image data, thereby adjusting a degree of transparency of embellishment effects.

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25 15. A projection display apparatus according to one of claims 10 to 14, further comprising:
a storage memory for storing a plurality of embellishment image data as

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the second embellishment image data;

wherein the second embellishment memory stores at least one embellishment image data selected from the storage memory.

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16. ^{The} A projection display apparatus according to claim 15, wherein the image embellishment section comprises a drawing section that draws the first embellishment image based on set drawing conditions;

the drawing section drawing the first embellishment image in the first embellishment memory based on at least a shape and position of the first embellishment image set by a user using a drawing instruction image which is one of the second embellishment images selected for setting conditions for drawing the first embellishment image.

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17. ^{The} A projection display apparatus according to claim 16, wherein, when the shape and position of the first embellishment image are to be set by using at least two drawing instruction images, the drawing section selects the at least two drawing instruction images having associated shapes which indicate the shape and position of the first embellishment image concerned, reads out the selected drawing instruction images from the storage memory and stores them in the second embellishment memory.

18. An image display apparatus, comprising:

a frame memory for storing given original image data;

a first embellishment memory for storing a first embellishment image data

25 representing a first embellishment image having a shape and size that can be set;

a second embellishment memory for storing a second embellishment image data representing a second embellishment image having a size that can be altered while a shape is maintained similar;

an image embellishment section that generates embellished image data
5 by overlaying an original image represented by the original image data with at least one of the first embellishment image and the second embellishment image;

an image display signal generator for generating image display signals based on the embellished image data; and

an electro-optical device for emitting light that forms images in response
10 to the image display signals.

19. A method of displaying images using a projection display apparatus having a light modulation unit to display an image based on image data given to the projection display apparatus by projecting the image onto a screen,
15 comprising the steps of:

preparing embellishment effect data representing an embellishment effect image that is used to embellish an arbitrary image;

generating embellished image data representing embellished image by overlaying an original image represented by the given image data and the
20 embellishment effect image;

driving the light modulation unit in response to the embellished image data pixel by pixel; and

projecting onto the screen the embellished image obtained by the light modulation unit.

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20. A method of displaying an image obtained by embellishment of original image data given to a projection display apparatus, comprising the steps of:

storing given original image data;

5 storing a first embellishment image data representing a first embellishment image having a shape and size that can be set;

storing a second embellishment image data representing a second embellishment image having a size that can be altered while a shape is maintained similar; and

10 generating embellished image data representing embellished image by overlaying an original image represented by the original image data with at least one of the first embellishment image and the second embellishment image.

21. A display control method of a projection display apparatus that
15 displays embellishment image overlaid on a given original image, comprising the steps of:

using a remote controller so as to display a menu screen overlay;

using the remote controller so as to select from the menu a desired embellishment image among a plurality of embellishment images and an
20 embellishment image display condition such as color;

erasing the menu screen and displaying an overlay of the selected embellishment image and a display pointer image symbolizing the display condition;

using the remote controller so as to move the display pointer image and
25 display an overlay of a starting pointer image at a starting position determined

for the embellishment image; and

using the remote controller to again move the display pointer image and determine an end position of the embellishment image to display an overlay of the embellishment image between the starting position and the end position
5 determined for the embellishment image.

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22. A display control method according to claim 21, wherein the starting position pointer image includes a plurality of pointer images that indicate a direction of the embellishment image overlay, and when the display pointer image is moved, one pointer image is selected from the plurality of pointer images
10 based on a direction in which the display pointer image is moving relative to the starting position.

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^{The}
23. A display control method according to claim 21 ~~or 22~~, wherein the embellishment image represents at least one of a line and area whose color can be selected from a plurality of colors, and at least the display pointer image is displayed overlaid as an image having a color corresponding to the selected color.
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